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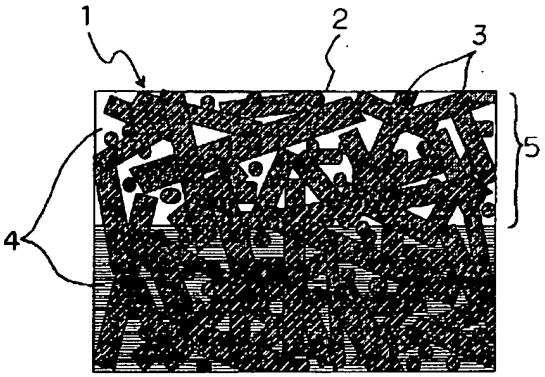
(54)【発明の名称】　窒化珪素質耐食性部材及びその製造方法

(57)【要約】

【課題】耐熱性に優れた窒化珪素質焼結体からなり、パーティクルの発生を抑制し得る窒化珪素質耐食性部材とその製造方法を提供する。

【解決手段】陽イオン不純物が０．５重量％以下の窒化珪素原料粉末に対して、少なくとも０．５重量％以上の希土類元素酸化物を添加混合した混合物を所定形状に成形、焼成して作製された相対密度９８％以上の窒化珪素質焼結体の少なくとも塩素系腐食ガス或いはそのプラズマに晒される面を塩素および／または水素を含むガス雰囲気で、８００～１９００℃で熱処理して粒界相を除去し、接触表面から１０μｍ以上の深さにわたり、少なくとも焼結助剤及び不純物を含む粒界相が、表面から１ｍｍの深さ位置における粒界相に対して面積比率で３分の１以下に除去した粒界相除去層を形成する。



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Tom,

Here is one of several data summaries from Japanes patent applications.

(21)Application number: **10079780**

(22)Date of filing: **26.03.1998**

(71)Applicant: **KYOCERA CORP**

(72)Inventor: **YOSHIDA MAKOTO**

(54) SILICON NITRIDE CORROSION RESISTANT MEMBER AND ITS PRODUCTION

(57)Abstract:

PROBLEM TO BE SOLVED: To obtain a silicon nitride corrosion resistant member consisting of silicon nitride sintered body excellent in heat resistance and capable of inhibiting the generation of particles, and further to provide a production method thereof.
SOLUTION: This silicon nitride corrosion resistant member is obtained by compacting a mixture obtained by adding at least 0.5 wt.% rare earth oxide to a silicon nitride raw material powder containing 0.5 wt.% cationic impurity, and mixing the raw material powder with the added rare earth oxide to form a prescribed shape, firing the obtained compact to provide a silicon nitride sintered body 1 having 98% relative density, heat-treating at least a face to be exposed to chlorine-based corrosive gas or a plasma, of the silicon nitride sintered body 1 in an atmosphere containing chlorine and/or hydrogen at 800-1,900°C to remove a grain boundary phase and to form a boundary phase-removed layer 5 regulated so that the boundary phase 4 containing at least a sintering adjuvant and an impurity over the depth of 10 m from the contacting surface 2 may be removed so as to be 1/3 times as much as that of the boundary phase at the depth of 1 mm from the surface expressed in terms of a surface ratio.

Etch conditions: BCl3, 100sccm, RIE 1.8kW, 4 Pa. 240hr exposure

Sintering Aid	Relative density	Heat treat Temp	Time	Gas	Depth etched	Particle count per 8"wafer

試料 No.	焼結助剤 残部は Si_3N_4 (重量%)	相対密度 (%)	熱処理条件 温度 (℃)	時間 (hr)	雰囲気	粒界相除去層の厚さ (μm)	X_1 — X_2	パーティクル発生量 個/8inch ウエハー
* 1	Y_2O_3 7.0	99.0	処理なし			0	1.0	28500
* 2	〃 〃	〃	700	20	Cl_2	3	0.5	16800
3	〃 〃	〃	800	20	Cl_2	12	0.2	800
4	〃 〃	〃	1000	20	Cl_2	23	0.2	600
* 5	〃 〃	〃	1300	5	Cl_2	8	0.6	8100
6	〃 〃	〃	1300	10	Cl_2	18	0.3	700
7	〃 〃	〃	1300	20	Cl_2	30	0.1	300
8	〃 〃	〃	1300	30	Cl_2	36	0.1	200
9	〃 〃	〃	1500	20	Cl_2	41	0.1	200
10	〃 〃	〃	1700	20	Cl_2	56	0.1	200
*11	Yb_2O_3 0.3	93.0	1300	20	H_2	51	0.0	測定不可
12	Yb_2O_3 0.7	98.0	1300	20	H_2	20	0.2	800
13	Yb_2O_3 2.0	98.5	1300	20	H_2	26	0.3	900
14	Yb_2O_3 8.0	98.7	1300	20	H_2	23	0.1	600
*15	Lu_2O_3 5.0	99.2	700	20	H_2	6	0.6	3900
16	〃 〃	〃	800	20	H_2	12	0.3	800
17	〃 〃	〃	1300	20	H_2	36	0.1	600
18	〃 〃	〃	1700	20	H_2	82	0.1	300
*19	Yb_2O_3 7.0	99.0	2000	20	Cl_2	150	0.0	測定不可

Measurement not possible

Measurement not possible

＊印は本発明の範囲外の試料を示す。

Table 1. Response to BCl3 plasma